General

Guideline Title

Allergen immunotherapy: a practice parameter third update.

Bibliographic Source(s)

Cox L, Nelson H, Lockey R, Calabria C, Chacko T, Finegold I, Nelson M, Weber R, Bernstein DI, Blessing-Moore J, Khan DA, Lang DM, Nicklas RA, Oppenheimer J, Portnoy JM, Randolph C, Schuller DE, Spector SL, Tilles S, Wallace D. Allergen immunotherapy: a practice parameter third update. J Allergy Clin Immunol. 2011 Jan;127(1 Suppl):S1-55. [479 references] PubMed

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Joint Task Force on Practice Parameters, American Academy of Allergy, Asthma and Immunology, American College of Allergy, Asthma and Immunology, Joint Council of Allergy, Asthma and Immunology. Allergen immunotherapy: a practice parameter second update. J Allergy Clin Immunol 2007 Sep;120(3 Suppl):S25-85. [352 references]

Regulatory Alert

FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- September 26, 2014 – Xolair (omalizumab) : A U.S. Food and Drug Administration (FDA) review of safety studies suggests a slightly increased risk of problems involving the heart and blood vessels supplying the brain among patients being treated with the asthma drug Xolair (omalizumab) than in those who were not treated with Xolair. As a result, FDA has added information about these potential risks to the drug label.

Recommendations

Major Recommendations

Guideline recommendations are presented in the form of summary statements. After each statement is a letter that indicates the strength of the recommendation. Grades of recommendations (A-D and NR) and categories of evidence (Ia, Ib, IIa, IIb, III, IV, LB, and NR) are defined at the

end of the "Major Recommendations" field.

Note: Key highlights of the update (new and modified information) may be found at the beginning of the guideline document.

Algorithm and Annotations for Immunotherapy

An algorithm is provided in the original guideline document for the appropriate use of allergen immunotherapy. Given below are annotations for use with that algorithm.

Box 1. Immunotherapy is effective in the management of allergic asthma, allergic rhinitis/conjunctivitis, and stinging insect hypersensitivity. There is some evidence it might be effective in the treatment of atopic dermatitis in patients with aeroallergen sensitivity. Allergen immunotherapy might prevent the development of asthma in subjects with allergic rhinitis. Evaluation of a patient with suspected allergic rhinitis, allergic conjunctivitis, allergic asthma, or stinging insect allergy includes a detailed history, an appropriate physical examination, and selected laboratory tests. A definitive diagnosis depends on the results of allergy testing (immediate hypersensitivity skin tests or in vitro tests for serum specific immunoglobulin E [IgE]).

Box 2. Immediate hypersensitivity skin testing is generally the preferred method of testing for specific IgE antibodies, although testing for serum specific IgE antibodies is useful under certain circumstances. Immunotherapy should be considered when positive test results for specific IgE antibodies correlate with suspected triggers and patient exposure.

Box 3. Immunotherapy should not be given to patients with negative test results for specific IgE antibodies or those with positive test results for specific IgE antibodies that do not correlate with suspected triggers, clinical symptoms, or exposure. This means that the presence of specific IgE antibodies alone does not necessarily indicate clinical sensitivity. There is no evidence from well-designed studies that immunotherapy for any allergen is effective in the absence of specific IgE antibodies.

Box 4. The management of allergic asthma, allergic rhinitis/conjunctivitis, and stinging insect hypersensitivity should include the evaluation of different treatment options. Each of the three major management approaches (allergen immunotherapy, allergen exposure reduction, and pharmacotherapy) has benefits, risks, and costs. Furthermore, the management plan must be individualized, with careful consideration given to the patient's preference. Disease severity and response (or lack of response) to previous treatment are important factors.

Box 5. The physician and patient should discuss the benefits, risks, and costs of the appropriate management options and agree on a management plan. Based on clinical considerations and the patient's preference, allergen immunotherapy might or might not be recommended. Patients with allergic rhinitis/conjunctivitis or allergic asthma whose symptoms are not well controlled by medications or avoidance measures or require high medication doses, multiple medications, or both to maintain control of their allergic disease might be good candidates for immunotherapy. Patients who experience adverse effects of medications or who wish to avoid or reduce the long-term use of medications are appropriate candidates for immunotherapy. However, asthma must be controlled at the time the immunotherapy injection is administered. Patients with aeroallergen-induced atopic dermatitis might benefit from immunotherapy. In general, patients with flying insect or imported fire ant hypersensitivity who are at risk for anaphylaxis should receive venom immunotherapy (VIT) or whole-body extract, respectively. VIT has also been shown to decrease large local reactions (LLRs) to stinging insects.

Box 6. After careful consideration of appropriate management options, the physician and patient might decide not to proceed with immunotherapy.

Box 7. Before immunotherapy is started, patients should understand its benefits, risks, and costs. Counseling should also include the expected onset of efficacy and duration of treatment, as well as the risk of anaphylaxis and importance of adhering to the immunotherapy schedule.

Box 8. The physician prescribing immunotherapy should be trained and experienced in prescribing and administering immunotherapy. The prescribing physician must select the appropriate allergen extracts based on that particular patient's clinical history and allergen exposure history and the results of tests for specific IgE antibodies. The quality of the allergen extracts available is an important consideration. When preparing mixtures of allergen extracts, the prescribing physician must take into account the cross-reactivity of allergen extracts and the potential for allergen degradation caused by proteolytic enzymes. The prescribing physician must specify the starting immunotherapy dose, the target maintenance dose, and the immunotherapy schedule. In general, the starting immunotherapy dose is 1,000- to 10,000-fold less than the maintenance dose. For highly sensitive patients, the starting dose might be lower. The maintenance dose is generally 500 to 2,000 allergy units (AU; e.g., for dust mite) or 1,000 to 4,000 bioequivalent allergy units (BAU; e.g., for grass or cat) for standardized allergen extracts. For nonstandardized extracts, a suggested maintenance dose is 3,000 to 5,000 protein nitrogen units (PNU) or 0.5 mL of a 1:100 or 1:200 wt/vol dilution of manufacturer’s extract. If the major allergen concentration of the extract is known, a range between 5 and 20 mg of major allergen is the recommended maintenance dose for inhalant allergens and 100 mg for Hymenoptera venom. Immunotherapy treatment can be divided into two periods, which are commonly referred to as the build-up and maintenance phases.

The immunotherapy build-up schedule (also called updosing, induction, or the dose-increase phase) entails administration of gradually increasing doses during a period of approximately 8 to 28 weeks. In conventional schedules a single dose increase is given on each visit, and the visit

frequency can vary from one to three times a week. Accelerated schedules, such as rush or cluster immunotherapy, entail administration of several injections at increasing doses on a single visit. Accelerated schedules offer the advantage of achieving the therapeutic dose earlier but might be associated with increased risk of a systemic reaction in some patients.

Box 9. Immunotherapy should be administered in a setting that permits the prompt recognition and management of adverse reactions. The preferred location for such administration is the prescribing physician's office. However, patients can receive immunotherapy injections at another health care facility if the physician and staff at that location are trained and equipped to recognize and manage immunotherapy reactions, particularly anaphylaxis. Patients should wait at the physician's office/medical clinic for at least 30 minutes after the immunotherapy injection or injections so that reactions can be recognized and treated promptly if they occur.

Immunotherapy injections should be withheld if the patient presents with an acute asthma exacerbation. For patients with asthma, consider measuring the peak expiratory flow rate before administering an immunotherapy injection and withholding an immunotherapy injection if the peak expiratory flow rate is considered low for that patient.

Box 10. Injections of allergen immunotherapy extract can cause local or systemic reactions. Most serious systemic reactions develop within 30 minutes after the immunotherapy injection. However, immunotherapy-induced systemic reactions can occur after 30 minutes. Patients should be counseled on the possibility of immediate and delayed systemic reactions during risk communication; an action plan for such an event should be discussed. In the event of a delayed systemic reaction, the patient should be counseled on appropriate treatment based on his or her symptoms.

Box 11. Local reactions can be managed with local treatment (e.g., cool compresses or topical corticosteroids) or antihistamines. Systemic reactions can be mild or severe. Epinephrine is the treatment of choice in patients with anaphylaxis.

Antihistamines and systemic corticosteroids are secondary medications that might help to modify systemic reactions but should never replace epinephrine in the treatment of anaphylaxis. Intravenous saline or supplemental oxygen might be required in severe cases. For additional details on anaphylaxis management see, "The diagnosis and management of anaphylaxis practice parameter: 2010 update."

The immunotherapy dose and schedule, as well as the benefits and risks of continuing immunotherapy, should be evaluated after any immunotherapy-induced systemic reaction. For some patients, the immunotherapy maintenance dose might need to be reduced. After systemic reactions to immunotherapy, the prescribing physician can re-evaluate the risk/benefit ratio of continued immunotherapy.

Box 12. Patients receiving maintenance immunotherapy should have follow-up visits at least every 6 to 12 months. Periodic visits should include a reassessment of symptoms and medication use, the medical history since the previous visit, and an evaluation of the clinical response to immunotherapy. The immunotherapy schedule and dose, reaction history, and patient compliance should also be evaluated. The physician can at this time make adjustments to the immunotherapy schedule or dose, as clinically indicated.

There are no specific markers that will predict who will remain in clinical remission after discontinuing effective allergen immunotherapy. Some patients might sustain lasting remission of their allergic symptoms after discontinuing allergen immunotherapy, but others might experience a recurrence of their symptoms. As with the decision to initiate allergen immunotherapy, the decision to discontinue treatment should be individualized, taking into account factors such as the severity of the patient's illness before treatment, the treatment benefit sustained, the inconvenience immunotherapy represents to a specific patient, and the potential effect a clinical relapse might have on the patient. Ultimately, the duration of immunotherapy should be individualized based on the patient’s clinical response, disease severity, immunotherapy reaction history, and preference.

Summary Statements

Immunologic Responses to Immunotherapy

1. The immunologic response to subcutaneous immunotherapy is characterized by decreases in the sensitivity of end organs and changes in the humoral and cellular responses to the administered allergens. (A)

2. Reduction in end-organ response with immunotherapy includes decreased early and late responses of the skin, conjunctiva, nasal mucosa, and bronchi to allergen challenge; decreased allergen-induced eosinophil, basophil, and mast cell infiltration; blunting of mucosal priming; and reduction of nonspecific bronchial sensitivity to histamine. (A)

3. Shortly after initiation of immunotherapy, there is an increase in $CD4^{+}CD25^{+}$ regulatory T lymphocytes secreting interleukin-10 (IL-10) and transforming growth factor-β (TGF-β) associated with immunologic tolerance, which is defined as a long-lived decrease in allergen-specific T-cell responsiveness. With continued immunotherapy, there is some waning of this response, and immune deviation from T helper cell-2 (T_H2) to T_H1 cytokine response to the administered allergen predominates. (A)

4. Specific IgE levels initially increase and then gradually decrease. Levels of specific immunoglobulin G1 (IgG1), IgG4, and IgA increase. None of these changes in antibody levels have been shown to consistently correlate strongly with clinical improvement. (A)

5. Increases in allergen-specific IgG levels are not predictive of the degree or duration of efficacy of immunotherapy. However, functional alterations in allergen-specific IgG levels, such as changes in avidity, affinity, or both for allergen, might play a role in determining clinical efficacy. (LB)

Efficacy of Immunotherapy

Allergic Rhinitis, Allergic Asthma, and Stinging Insect Hypersensitivity

6. Immunotherapy is effective for the treatment of allergic rhinitis, allergic conjunctivitis, allergic asthma, and stinging insect hypersensitivity. Therefore immunotherapy merits consideration in patients with these disorders as a possible treatment option. (A)

Patient Selection

See Table III in the original guideline document for indications for allergen immunotherapy in patients with allergic rhinitis, allergic conjunctivitis, or asthma.

Clinical Indications for Allergic Rhinitis and Allergic Asthma

7. Allergen immunotherapy should be considered for patients who have demonstrable evidence of specific IgE antibodies to clinically relevant allergens. The decision to begin allergen immunotherapy might depend on a number of factors, including but not limited to patient's preference/acceptability, adherence, medication requirements, response to avoidance measures, and the adverse effects of medications. (D)

Atopic Dermatitis

8. There are some data indicating that immunotherapy can be effective for atopic dermatitis when this condition is associated with aeroallergen sensitivity. (B)

9. The potential for benefit in symptoms related to oral allergy syndrome with inhalant immunotherapy directed at the cross-reacting pollens has been observed in some studies but not in others. For this reason, more investigation is required to substantiate that a benefit in oral allergy symptoms will occur with allergen immunotherapy. (C)

10a. Immunotherapy should be considered if the patient has had a systemic reaction to a Hymenoptera sting, especially if such a reaction was associated with respiratory symptoms, cardiovascular symptoms, or both and if the patient has demonstrable evidence of specific IgE. (A)

10b. Measurement of baseline serum tryptase level is recommended in patients with moderate or severe anaphylactic reactions to stings because its predictive value is useful regardless of the decision about VIT. Increased tryptase levels are associated with more frequent and more severe anaphylactic reactions to stings, as well as greater failure rates with VIT and greater relapse rates after stopping VIT. (B)

11. LLRs to insect stings can cause significant morbidity and impair quality of life. VIT might significantly reduce the size and duration of LLRs and might be considered in patients who have frequent and disabling LLRs, particularly those with occupational exposure. (B)

Conditions for Which Immunotherapy Is Investigational

Food Hypersensitivity

12. Clinical trials do not support the use of subcutaneous immunotherapy for food hypersensitivity. (A)

13. The safety and efficacy of oral and sublingual immunotherapy for food hypersensitivity is currently investigational. (NR)

Conditions for Which Immunotherapy Is Not Indicated

Urticaria and Angioedema

14. Clinical studies do not support the use of allergen immunotherapy for chronic urticaria, angioedema, or both. Therefore allergen immunotherapy for patients with chronic urticaria, angioedema, or both is not recommended. (D)

Measures of Efficacy

15. Clinical parameters, such as symptoms and medication use, might be useful measures of the efficacy of immunotherapy in a clinical setting; however, repetitive skin testing of patients receiving immunotherapy is not recommended. (A)

Special Precautions in Patients with Asthma

16. Allergen immunotherapy in asthmatic patients should not be initiated unless the patient's asthma is stable with pharmacotherapy. (C) See Table IV in the original guideline document for actions to reduce immunotherapy risk.

Special Considerations in Immunotherapy

Allergen Immunotherapy in Children

17. Immunotherapy for children is effective and well tolerated. It has been shown to prevent the new onset of allergen sensitivities in monosensitized patients, as well as progression from allergic rhinitis to asthma. Therefore immunotherapy should be considered along with pharmacotherapy and allergen avoidance in the management of children with allergic rhinitis/rhinoconjunctivitis, allergic asthma, and stinging insect hypersensitivity. (B) See Table III in the original guideline document for indications for allergen immunotherapy in patients with allergic rhinitis, allergic conjunctivitis, or asthma.

18. Immunotherapy can be initiated in young children. Indications are similar to those of other age groups. (D)

19. In patients who otherwise have the indication for specific immunotherapy, there is no absolute upper age limit for initiation of immunotherapy. (D)

Immunotherapy in Pregnancy

See Table IV in the original guideline document for actions to reduce immunotherapy risk.

20a. Allergen immunotherapy can be continued but is usually not initiated in the pregnant patient. (C)

20b. If pregnancy occurs during the build-up phase and the patient is receiving a dose unlikely to be therapeutic, discontinuation of immunotherapy should be considered. (D)

Immunotherapy in Patients with Immunodeficiency and Autoimmune Disorders

21. Immunotherapy can be considered in patients with immunodeficiency and autoimmune disorders. (C)

Follow-up Care and Duration of Treatment

Continuing Care

Time Course of Improvement

22. Clinical and physiological improvement can be demonstrated very shortly after the patient reaches a maintenance dose. (A)

Follow-up Visits

23. Patients should be evaluated at least every 6 to 12 months while they receive immunotherapy. (D)

Duration of Treatment

24. The patient's response to immunotherapy should be evaluated on a regular basis. A decision about continuation of effective immunotherapy should generally be made after the initial period of 3 to 5 years of treatment. Some patients might experience sustained clinical remission of their allergic disease after discontinuing immunotherapy, but others might relapse. The severity of disease, benefits sustained from treatment, and convenience of treatment are all factors that should be considered in determining whether to continue or stop immunotherapy for any individual patient. (D)

25. Although there are no specific tests to distinguish which patients will relapse after discontinuing VIT, there are clinical features that are associated with a higher chance of relapse, notably a history of a very severe reaction to a sting, an increased baseline serum tryptase level, a systemic reaction during VIT (to a sting or a venom injection), honeybee venom allergy, and treatment duration of less than 5 years. (C)

26. At present, there are no specific tests or clinical markers that will distinguish between patients who will relapse and those who will remain in long-term clinical remission after discontinuing effective inhalant allergen immunotherapy, and the duration of treatment should be determined by the physician and patient after considering the risks and benefits associated with discontinuing or continuing immunotherapy. (D)

Safety of Immunotherapy

Local Reactions

27. Published studies indicate that individual local reactions do not appear to be predictive of subsequent systemic reactions. However, some patients with a greater frequency of large local reactions might be at an increased risk for future systemic reactions. (C)

28. Local reactions were found to not predict local reactions at the next injection in a retrospective study. (C)

29. Glycerin concentrations of up to 50% were not associated with significantly higher local reaction rates. Higher glycerin concentrations are associated with injection pain, which correlates with the total amount of glycerin injected. (C)

Management of LLRs

30. Antihistamines have been demonstrated to be beneficial in decreasing local reactions during cluster and rush protocols, whereas leukotriene antagonists were shown to be effective in a rush protocol. Although commonly used, the effect of these medications in reducing local reactions during conventional build-up and maintenance immunotherapy injections has not been extensively reported. (A)

Systemic Reactions

31. Although there is a low risk of severe systemic reactions with appropriately administered allergen immunotherapy, life-threatening and fatal reactions do occur. (A)

32. An assessment of the patient's current health status should be made before administration of the allergy immunotherapy injection to determine whether there were any health changes that might require modifying or withholding that patient's immunotherapy treatment. Poorly controlled asthma has been identified as a risk factor for a severe immunotherapy-induced reaction. Before the administration of the allergy injection, the patient should be evaluated for the presence of asthma symptoms. One might also consider an objective measure of airway function (e.g., peak flow) for the asthmatic patient before allergy injections. (B)

Timing of Anaphylactic Reactions to Immunotherapy Injections

33. The majority of safety data on allergen immunotherapy reactions are in the context of 30 minutes. Because most serious systemic reactions from allergen immunotherapy occur within 30 minutes after an injection, patients should remain in the physician's office/medical clinic for at least 30 minutes after the immunotherapy injection. (C)

34. Delayed systemic reactions, defined as occurring after the 30-minute wait period, can occur and, in general, are not severe. (B)

35. Biphasic immunotherapy reactions, defined as resolution of the initial reaction with recurrence at 2 to 24 hours, were reported in up to 23% of patients who experienced a systemic reaction after allergen immunotherapy in one study. Biphasic reactions were typically less severe than the initial reaction. (C)

36. Several large studies demonstrate that life-threatening anaphylactic reactions after the first 30 minutes are rare. Delayed and biphasic immunotherapy-induced systemic reactions can occur outside of a supervised medical facility. Thus patients should be educated regarding the possible signs and symptoms of systemic reactions and to contact their health care professional or seek emergency medical attention, as indicated. The decision to prescribe epinephrine autoinjectors to patients receiving allergen immunotherapy is up to the physician's discretion and is based on a number of considerations. (C)

β-Blockers and Angiotensin-Converting-Enzyme (ACE) Inhibitors

37. Exposure to β-adrenergic blocking agents is a risk factor for more serious and treatment-resistant anaphylaxis. Concomitant use of β-blockers and allergen immunotherapy should be carefully considered from an individualized risk/benefit standpoint and incorporate the patient's preferences in the medical decision-making process. (C)

38. The balance of possible risks and benefits is not the same for patients with the potential for life-threatening stinging insect reactions who are also taking a β-blocker. In patients who are unable to replace a β-blocker with an equally efficacious alternative, concomitant administration of VIT and a β-blocker is warranted. (C)

39. Glucagon might be efficacious for the treatment of refractory β-blocker–associated anaphylaxis. (C)

40. ACE inhibitors have been associated with greater risk for more severe reaction from VIT, as well as field stings. ACE inhibitor discontinuation should be considered for patients receiving VIT. Concurrent administration of VIT and an ACE inhibitor is warranted in selected cases in which no equally efficacious alternative for an ACE inhibitor exists and this is judged to be favorable from an individualized risk/benefit standpoint and consideration of patients' preferences. No evidence exists that angiotensin receptor blockers are associated with greater risk for anaphylaxis from

allergen immunotherapy. (C)

41. β-blockers and ACE inhibitors are frequently prescribed in combination. Concomitant administration of both of these medications in a patient who requires VIT might be warranted, if favorable, from an individualized assessment of potential risks and benefits and patients' preferences. (D)

Patient Requirements and Contraindications

42. Patients selected for immunotherapy should be cooperative and compliant. (D)

Special Precautions in Patients with Asthma

43. Allergen immunotherapy in asthmatic patients should not be initiated unless the patient's asthma is stable. (C)

44. Medical conditions that reduce the patient's ability to survive the systemic allergic reaction or the resultant treatment are relative contraindications for allergen immunotherapy. Examples include severe asthma uncontrolled by pharmacotherapy and significant cardiovascular disease. (C)

Reducing the Risk of Anaphylaxis to Immunotherapy Injections

45. Allergen immunotherapy should be administered in a setting where procedures that can reduce the risk of anaphylaxis are in place and where the prompt recognition and treatment of anaphylaxis is ensured. (C) See Table VI in the original guideline document for recommended equipment and medications to treat immunotherapy systemic reactions.

Management of Immunotherapy-Induced Systemic Reactions

46. Epinephrine is the treatment of choice for immunotherapy-induced systemic reactions. Risk factors for fatal immunotherapy-induced reactions include delayed administration of epinephrine. (B)

Immunotherapy Schedules and Doses

Starting Doses

47. The starting dose for build-up is usually a 1,000-fold or 10,000-fold dilution of the maintenance concentrate, although a lower starting dose might be advisable for highly sensitive patients. (D)

Frequency of Build-up Injections

48. The frequency of allergen immunotherapy administration during a conventional build-up phase is generally one to three injections per week. (D)

49. The dose of allergen immunotherapy extract should be appropriately reduced after a systemic reaction if immunotherapy is continued. (D)

Reductions during Periods of Exacerbation of Symptoms

50. Immunotherapy given during periods when the patient is exposed to increased levels of allergens to which they are highly sensitive might be associated with an increased risk of a systemic reaction. However, although survey data have noted this to be a risk factor for severe reactions, several published studies have not found an association between pollen seasons and systemic reactions. (C)

Dose Adjustments for Late Injections

51. There is no retrospective or prospective published evidence to support modification of doses of allergen immunotherapy because of treatment gaps during the build-up or maintenance immunotherapy phases. However, it is customary to reduce the dose of allergen immunotherapy extract when the interval between injections is prolonged. (D)

Cluster Schedules

52. With cluster immunotherapy, two or more injections are administered per visit to achieve a maintenance dose more rapidly than with conventional schedules. (C)

53. Studies with single allergens using a cluster schedule demonstrated a similar or increased frequency of systemic reactions compared with immunotherapy with conventional schedules. (A)

Rush Schedules

54. Rush schedules can achieve a maintenance dose more quickly than weekly schedules. (A)

55. Rush schedules with inhalant allergens are associated with an increased risk of systemic reactions. However, rush protocols for administration of stinging Hymenoptera venom have not been associated with a similarly high incidence of systemic reactions. (A)

Premedication and Immunotherapy-Induced Systemic Reactions

Premedication and Weekly Immunotherapy

56. Premedication might reduce the frequency of systemic reactions caused by conventional immunotherapy. (A)

Premedication with Accelerated Immunotherapy Schedules

57. Premedication before cluster and rush immunotherapy with aeroallergens might reduce the rate of systemic reactions. Combination therapy is effective in reducing systemic and local reactions during accelerated immunotherapy build-up protocols. (A)

Omalizumab in Combination with Immunotherapy

58. Omalizumab pretreatment has been shown to improve the safety and tolerability of cluster and rush immunotherapy schedules in patients with moderate persistent asthma and allergic rhinitis, respectively. Additionally, omalizumab used in combination with immunotherapy has been shown to be effective in improving symptom scores compared with immunotherapy alone. (A)

Maintenance Schedules

59. Once a patient reaches a maintenance dose, the interval between injections often can be progressively increased, as tolerated, up to an interval of 4 weeks for inhalant allergens and up to 8 weeks for venom. Some subjects might tolerate longer intervals between maintenance dose injections. (A)

Injection Techniques

60. Allergen immunotherapy extract injections should be given with a calibrated small-volume syringe with a 26- to 27-gauge 1/2- or 3/8-inch nonremovable needle. (C)

61. The injection should be given subcutaneously in the lateral or posterior portion of the arm. (D)

Location of Allergen Immunotherapy Administration

Supervising Medical Personnel

62. Regardless of the location, allergen immunotherapy should be administered under the direct supervision of an appropriately trained physician, qualified physician extender (nurse practitioner or physician assistant), or both in a facility with the appropriate equipment, medications, and personnel to treat anaphylaxis. (D)

Prescribing Physician's Office

63. The preferred location for administration of allergen immunotherapy is in the office of the physician who prepared the patient's allergen immunotherapy extract. (D)

64. Patients at high risk of systemic reactions, where possible, should receive immunotherapy in the office of the physician who prepared the patient's allergen immunotherapy extract. (D)

Outside Medical Facilities

Home Administration

65. In rare and exceptional cases when allergen immunotherapy cannot be administered in a medical facility and withholding this therapy would result in a serious detriment to the patient's health (e.g., VIT for a patient living in a remote area), careful consideration of potential benefits and risks of at-home administration of allergen immunotherapy should be made on an individual basis. If this approach is used, informed consent should be obtained from the patient, and the person administering the injection to the patient must be educated about how to administer immunotherapy and recognize and treat anaphylaxis. (D) See Table VI in the original guideline document for recommended equipment and medications to treat immunotherapy systemic reactions.

Transferring Allergen Immunotherapy Care

66. If a patient receiving immunotherapy transfers from one physician to another, a decision must be made by the physician to whom the patient has transferred as to whether to continue immunotherapy. (D)

67. If immunotherapy is continued, a decision must then be made about whether to continue unchanged the immunotherapy program initiated by the previous physician or to start a new immunotherapy program. Patients can continue to receive the immunotherapy extract prepared by the patient's previous physician if this is acceptable to the transferring and accepting physicians. (D)

68. A detailed documentation of the patient's schedule and allergen extract content must accompany a patient when he or she transfers responsibility for immunotherapy care from one physician to another. In addition, a record of previous response to and compliance with this program should be communicated to the patient's new physician. (D)

69. An allergen immunotherapy extract must be considered different if there is any change. There is potentially an increased risk of a systemic reaction if the immunotherapy extract is changed because of the possible variability in the composition and potency of allergen extracts. If the allergen immunotherapy extract is changed, the patient might need to be retested for specific IgE sensitivity and started on an immunotherapy formulation and schedule that is based on this re-evaluation. (D)

Allergen Extract Selection and Handling

See Tables VII and VIII in the original guideline document for allergen immunotherapy extract preparation guidelines and sterile compounding standards for allergy vaccine preparation, respectively.

Specific Allergens

70. Immunotherapy is effective for pollen, animal allergens, dust mite, mold/fungi, and Hymenoptera hypersensitivity. Therefore immunotherapy should be considered as part of the management program in patients who have symptoms related to exposure to these allergens, as supported by the presence of specific IgE antibodies. (A)

Cockroach

71. There are limited data on the efficacy of cockroach immunotherapy. (B)

Multiallergen Immunotherapy

72. There are few studies that have investigated the efficacy of multiallergen subcutaneous immunotherapy. These studies have produced conflicting results, with some demonstrating significant clinical improvement compared with placebo and others showing no benefit over optimal pharmacotherapy and environmental control measures. Thus it is important to treat the patients only with relevant allergens. (B)

Basis of Allergen Extract Selection

73. The selection of the components of an allergen immunotherapy extract should be based on a careful history in correlation with positive allergy skin test results or serum specific IgE antibodies. The allergen immunotherapy extract should contain only clinically relevant allergens. In choosing the components for a clinically relevant allergen immunotherapy extract, the physician should be familiar with local and regional aerobiology and indoor and outdoor allergens, paying special attention to potential allergens in the patient's own environment. (D)

Skin Tests and Serum Specific IgE Antibody Tests

74. Skin testing has been the primary diagnostic tool in clinical studies of allergen immunotherapy. Therefore in most patients skin testing should be used to determine whether the patient has serum specific IgE antibodies. Appropriately interpreted serum specific IgE antibodies can also be used. (C)

Allergen Extract Selection

75. Nonstandardized extracts can vary widely in biologic activity and composition, regardless of a particular weight/volume or PNU potency, and should not be considered equipotent. (B)

76. When possible, standardized extracts should be used to prepare the allergen immunotherapy extract treatment sets. (A)

Allergen Extract Preparation

77. Allergen immunotherapy extract preparation should be performed by persons experienced and trained in handling allergenic products. A customized allergen immunotherapy extract should be prepared from a manufacturer's extract or extracts in accordance to the patient's clinical history and allergy test results and might contain single or multiple allergens. (D)

Principles of Mixing Allergen Immunotherapy

78. Consideration of the following principles is necessary when mixing allergen extracts: (1) cross-reactivity of allergens, (2) optimization of the dose of each constituent, and (3) enzymatic degradation of allergens. (B)

Cross-Reactivity of Allergen Extract

79. The selection of allergens for immunotherapy should be based in part on the cross-reactivity of clinically relevant allergens. Knowledge of allergen cross-reactivity is important in the selection of allergens for immunotherapy because limiting the number of allergens in a treatment vial might be necessary to attain optimal therapeutic doses of each of the components. Many botanically related pollens contain allergens that are cross-reactive. When pollens are substantially cross-reactive, selection of a single pollen within the cross-reactive genus or subfamily might suffice. When pollen allergens are not substantially cross-reactive, testing for and treatment with multiple locally prevalent pollens might be necessary. (B)

Dose Selection

80. The efficacy of immunotherapy depends on achieving an optimal therapeutic dose of each of the constituents in the allergen immunotherapy extract. (A)

81. The maintenance concentrate should be formulated to deliver a dose considered to be therapeutically effective for each of its constituent components. The maintenance concentrate vial is the highest concentration allergy immunotherapy vial (e.g., 1:1 vol/vol vial). The projected effective dose is called the maintenance goal. Some subjects unable to tolerate the projected effective dose will experience clinical benefits at a lower dose. The maintenance dose is the dose that provides therapeutic efficacy without significant adverse local or systemic reactions and might not always reach the initially calculated projected effective dose. This reinforces that allergy immunotherapy must be individualized. (A)

Proteolytic Enzymes and Mixing

82. Studies designed to investigate the effect of combining extracts with high proteolytic activity, such as cockroach and mold/fungi, with extracts such as pollen, dander, and dust mite, have demonstrated a significant loss of potency with some of these extracts. Separation of extracts with high proteolytic enzyme activities from other extracts is recommended. It might be necessary to prepare two or more vials to provide allergen immunotherapy containing an optimal dose of each component while avoiding allergen extract combinations that might result in degradation of some or all of the components. (B)

Allergen Immunotherapy Extract Handling

Storage

83. Allergen immunotherapy extracts should be stored at 4ºC to 8ºC to reduce the rate of potency loss. (B)

84. Extract manufacturers conduct stability studies with standardized extracts that expose them to various shipping conditions. It is the responsibility of each supplier or manufacturer to ship extracts under validated conditions that are shown not to adversely affect the product's potency or safety. (C)

Allergen Extract Expiration Dates

85. In determining the allergen immunotherapy extract expiration date, consideration must be given to the fact that the rate of potency loss over time is influenced by several factors separately and collectively, including (1) storage temperature, (2) presence of stabilizers and bactericidal agents, (3) concentration, (4) presence of proteolytic enzymes, and (5) volume of the storage vial. (D)

Customized Individualized Allergen Immunotherapy Extracts

86. Administration of an incorrect injection is a potential risk of allergen immunotherapy. An incorrect injection is an injection given to the wrong patient or a correct patient receiving an injection of an incorrect dose. A customized individual maintenance concentrate of the allergen immunotherapy extract and serial dilutions, whether a single extract or a mixture of extracts, prepared and labeled with the patient's name and birth date might reduce the risk of incorrect (i.e., wrong patient) injection. (D)

87. The mixing of antigens in a syringe is not recommended because of the potential for treatment errors and cross-contamination of extracts. (C)

Allergen Extract Dilution Labeling and Nomenclature

88. Serial dilutions of the maintenance concentrate should be made in preparation for the build-up phase of immunotherapy. (D)

Effect of Dilution on Dose

89. Dilution limits the number of antigens that can be added to a maintenance concentrate if a therapeutic dose is to be delivered. (A)

90. A consistent uniform labeling system for dilutions from the maintenance concentrate might reduce errors in administration and therefore is recommended. (D)

Documentation and Record Keeping

91. The allergen immunotherapy extract contents, informed consent for immunotherapy, and administration of extracts should be documented. (D)

Noninjection Routes of Immunotherapy

92. Allergen extracts can be administered through several routes in addition to the subcutaneous route. Currently, there are no U.S. Food and Drug Administration (FDA)-approved formulations for a noninjection immunotherapy extract. (A)

93. Randomized controlled clinical trials with dust mite and pollen sublingual immunotherapy (SLIT) have demonstrated significant improvement in symptoms and medication use in patients with allergic rhinitis and asthma. (A)

Adverse Reactions to SLIT

94. Local reactions, primarily oral mucosal, are common with SLIT. Systemic reactions can occur, and a few have been reported in subjects who were unable to tolerate subcutaneous immunotherapy. A few reported cases have been of a severity to be categorized as anaphylaxis. (A)

95. Clinical trials are evaluating the safety and efficacy of SLIT for patients with ragweed- and grass pollen–induced allergic rhinitis. Currently, there are no FDA-approved formulations for SLIT. (A)

Intranasal Immunotherapy

96. Randomized controlled studies have demonstrated that nasal immunotherapy with dust mite and pollen extracts is effective in reducing symptoms and medication use. Local adverse reactions are common with this approach and are the most frequently cited reason for discontinuation of treatment in one large prospective study. The use of this approach has decreased considerably since the introduction of SLIT. (C)

Intralymphatic

97. A three-injection course of intralymphatic immunotherapy was as effective as a three-year course of conventional subcutaneous immunotherapy in a noncontrolled study. (NR)

Epicutaneous

98. Epicutaneous immunotherapy resulted in significantly higher treatment success in a placebo-controlled study. However, there were no significant differences in the primary outcome and nasal provocation test scores between the groups. (NR)

Oral Immunotherapy and SLIT for Food Hypersensitivity

99. Several clinical trials with oral immunotherapy and SLIT demonstrate an increased tolerance to oral food challenge in subjects with food hypersensitivity while receiving therapy. Oral and sublingual food immunotherapy is investigational. (NR)

Novel Formulations: Allergoids and Adjuvants

100. Allergoids are modified allergen extracts processed in a way that reduces the extract's allergenicity while preserving its antigenicity. (B)

101. Adjuvants might enhance the effectiveness of allergen immunotherapy by shifting the immune response toward T_H1 production. The two adjuvants most extensively studied with allergen immunotherapy are an immunostimulatory oligonucleotide sequence of DNA containing a CpG motif (CpG) and 3-deacylated monophospholipid A (MPL). Clinical trials with these adjuvants, in combination with ragweed (CpG and MPL) and grasses (MPL), demonstrate significant improvement in allergic rhinitis symptoms with four to six injections administered preseasonally. Neither of these adjuvants are available as FDA-approved allergen extracts. (NR)

Definitions:

Category of Evidence

Ia Evidence from meta-analysis of randomized controlled trials

Ib Evidence from at least 1 randomized controlled trial

IIa Evidence from at least 1 controlled study without randomization

IIb Evidence from at least 1 other type of quasi-experimental study

III Evidence from nonexperimental descriptive studies, such as comparative studies, correlation studies, and case control studies

IV Evidence from expert committee reports or opinions or clinical experience of respected authorities, or both

LB Evidence from laboratory-based studies

NR Not rated

Strength of Recommendations

A Directly based on category I evidence

B Directly based on category II evidence or extrapolated from category I evidence

C Directly based on category III evidence or extrapolated from category I or II evidence

D Directly based on category IV evidence or extrapolated from category I, II, or III evidence

NR Not rated

Clinical Algorithm(s)

An annotated clinical algorithm for the appropriate use of allergen immunotherapy is provided in the original guideline document.

Scope

Disease/Condition(s)

Allergic diseases, including:

- Allergic rhinitis
- Allergic conjunctivitis
- Allergic asthma
- Stinging insect (e.g., Hymenoptera) sensitivity
- Atopic dermatitis

Guideline Category

Counseling

Evaluation

Management

Prevention

Risk Assessment

Treatment

Clinical Specialty

Allergy and Immunology

Family Practice

Internal Medicine

Pediatrics

Preventive Medicine

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

- To optimize the practice of allergen immunotherapy for patients with allergic diseases
- To establish guidelines for the safe and effective use of allergen immunotherapy, while reducing unnecessary variation in immunotherapy practice

Target Population

- Patients with allergic diseases whose symptoms are not controlled adequately by medications and avoidance measures or those experiencing unacceptable adverse effects of medications or who wish to reduce the long-term use of medications
- Patients with a history of a systemic reaction to Hymenoptera stings who demonstrate Hymenoptera-specific immunoglobulin E (IgE) antibodies

Interventions and Practices Considered

1. Evaluation of patient with suspected allergic rhinitis, allergic rhinoconjunctivitis, allergic asthma, stinging insect allergy, or atopic dermatitis
    - Physical examination
    - Detailed history
    - Measurement of baseline tryptase for patients under consideration for venom immunotherapy (VIT)
    - Assessment of concomitant medications, especially cardioselective β-blockers and angiotensin-converting enzyme (ACE) inhibitors
2. Immediate hypersensitivity skin testing (preferred) or in vitro testing for specific immunoglobulin E (IgE) antibodies
3. Assessment of risks, benefits and costs of appropriate management options
4. Formation of individualized management plan
5. Counseling and educating patients about benefits and risk of immunotherapy
6. Obtaining informed consent
7. Allergen selection, formulation, labeling, and handling
8. Establishing starting dose and target maintenance dose
9. Administering immunotherapy with appropriate safety equipment and procedures in place
10. Management of reactions to immunotherapy injections
11. Use of premedication
12. Follow-up for clinical response and continuation of immunotherapy treatment
13. Special considerations for immunotherapy in children, the elderly, and the pregnant patient and in patients with immunodeficiency and autoimmune disorders

Note: The following were considered, but not recommended:

Subcutaneous immunotherapy for food allergy
Immunotherapy for chronic urticaria, angioedema, or both
Repetitive skin testing for measuring efficacy
Mixing of antigens in the syringe
Low-dose immunotherapy
Immunotherapy with palm, sedge, and cattail extracts
Mixing of venoms

Major Outcomes Considered

- Efficacy of immunotherapy
  - Symptom improvement
  - Reduction in medication
  - Sensitivity of end organs
  - Serologic and immunologic changes
  - Quality of life
  - Clinical remission
  - Rate of relapse
- Safety of immunotherapy (e.g., rates of adverse events, risk of dosing error; fatal and near fatal reactions)
- Efficacy of treatments for adverse events
- Timing of anaphylactic reactions following immunotherapy treatments
- Predictive value of markers for immunotherapy efficacy or adverse events
- Sensitivity of tests for selections of allergens for inclusion in immunotherapy

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

A search of the medical literature was performed for terms relevant to this practice parameter including allergy immunotherapy, allergy immunotherapy efficacy, allergy immunotherapy safety, immunotherapy mechanism of action, subcutaneous immunotherapy, and sublingual immunotherapy. Literature searches were performed using PubMed, Google Scholar, and the Cochrane Database of Systematic Reviews. All reference types were included in the results. References identified as being relevant were searched for missing references. In addition, members of the workgroup were asked to include references that may have been overlooked from this process and included references from 1960 until June 2010. While the ideal type of reference would consist of a randomized double-blind placebo-controlled study, (inclusion/exclusion criteria) not all studies met this criterion. Consequently, it was necessary to draw upon a number of observational studies along with basic laboratory reports to develop a complete document regarding this topic. Inclusion/exclusion criteria did include English language articles only.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Category of Evidence

Ia Evidence from meta-analysis of randomized controlled trials

Ib Evidence from at least 1 randomized controlled trial

IIa Evidence from at least 1 controlled study without randomization

IIb Evidence from at least 1 other type of quasi-experimental study

III Evidence from nonexperimental descriptive studies, such as comparative studies, correlation studies, and case-control studies

IV Evidence from expert committee reports or opinions, clinical experience of respected authorities, or both

LB Evidence from laboratory-based studies

NR Not rated

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Published clinical studies were rated by category of evidence and used to establish the strength of a clinical recommendation. Laboratory-based studies were not rated.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

This document was developed by the Joint Task Force on Practice Parameters, which represents the American Academy of Allergy, Asthma and Immunology (AAAAI); the American College of Allergy, Asthma, and Immunology (ACAAI); and the Joint Council of Allergy, Asthma, and Immunology (JCAAI). This document builds on the previous Joint Task Force document, "Allergen immunotherapy: a practice parameter second update" published in the *Journal of Allergy and Clinical Immunology* in 2007. The updated practice parameter draft was prepared by a work group that included three of the editors from the second update, and other workgroup members.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendations

A Directly based on category I evidence

B Directly based on category II evidence or extrapolated from category I evidence

C Directly based on category III evidence or extrapolated from category I or II evidence

D Directly based on category IV evidence or extrapolated from category I, II, or III evidence

NR Not rated

Cost Analysis

Published cost analyses were reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

These guidelines have undergone an extensive peer-review process consistent with recommendations of the American College of Medical Quality's "Policy on development and use of practice parameters for medical quality decision-making."

The working draft of "Allergen immunotherapy: a practice parameter third update" was reviewed by a large number of individuals. Reviewers include persons appointed by the American Academy of Allergy, Asthma & Immunology (AAAAI), the American College of Allergy, Asthma & Immunology (ACAAI), and invited experts. Invited reviewers included those with known expertise in specific areas (e.g., oral immunotherapy or immunotherapy mechanisms), the U.S. Food and Drug Administration's (FDA) Center for Biologics Evaluation and Research, and the American Academy of Otolaryngic Allergy, who formally endorsed the previous practice parameter update. The scientific representatives of the U.S. Allergen Extract Manufacturers were invited through their organization, the Allergenic Products Manufacturing Association, to review and comment on the allergen extract section.

In addition, the draft was posted on the ACAAI and AAAAI Web sites with an invitation for members to review and comment. The authors carefully considered all of these comments in preparing the final version.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate allergen immunotherapy practices for patients with allergic diseases, including rhinitis, allergic asthma, Hymenoptera sensitivity, and atopic dermatitis

Potential Harms

- The major risk of allergen immunotherapy is anaphylaxis, which in rare cases can be fatal, despite optimal management.
- Local reactions associated with allergen immunotherapy are fairly common.
- Several large studies demonstrate that life-threatening anaphylactic reactions after the first 30 minutes are rare. Delayed and biphasic immunotherapy-induced systemic reactions can occur outside of a supervised medical facility. Thus patients should be educated regarding the possible signs and symptoms of systemic reactions and to contact their health care professional or seek emergency medical attention, as indicated.

- Adverse effects are no greater in frequency or severity with venom immunotherapy (VIT) for atopic dermatitis than with inhalant allergen immunotherapy (despite the more severe nature of the reaction to natural exposure). In contrast to inhalant rush immunotherapy, rush VIT is not associated with an increased incidence of systemic reactions.
- Exposure to β-adrenergic blocking agents is a risk factor for more serious and treatment-resistant anaphylaxis.
- Angiotensin-converting enzyme (ACE) inhibitors have been associated with greater risk for more severe reaction from VIT, as well as field stings.
- β-blockers and ACE inhibitors are frequently prescribed in combination. Patients receiving both drugs are at heightened risk from VIT because the potential for anaphylaxis that is more severe, treatment resistant, or both might be additive; however, an individualized risk/benefit assessment favors concomitant administration of VIT along with these medications because this intervention offers the potential for greater benefit than the alternatives of either withholding VIT or drug suspension.
- Immunotherapy given during periods when the patient is exposed to increased levels of allergens to which they are highly sensitive might be associated with an increased risk of a systemic reaction. However, although survey data have noted this to be a risk factor for severe reactions, several published studies have not found an association between pollen seasons and systemic reactions.
- Studies with single allergens using a cluster schedule demonstrated a similar or increased frequency of systemic reactions compared with immunotherapy with conventional schedules. The occurrence of both local and systemic reactions to cluster immunotherapy might be reduced with antihistamine premedication.
- Rush schedules with inhalant allergens are associated with an increased risk of systemic reactions.
- There is potentially an increased risk of a systemic reaction if the immunotherapy extract is changed because of the possible variability in the composition and potency of allergen extracts.
- Local reactions, primarily oral-mucosal, are common with to sublingual immunotherapy (SLIT). Systemic reactions can occur, and a few have been reported in subjects who were unable to tolerate subcutaneous immunotherapy. A few reported cases have been of a severity to be categorized as anaphylaxis.
- The major adverse effect of epicutaneous immunotherapy was an eczematous reaction at the application sites.
- Local adverse reactions are common with intranasal immunotherapy.
- In one study of peanut oral immunotherapy, most adverse reactions occurred during the initial escalation day, with upper respiratory tract (79%) and abdominal (68%) symptoms being the most common adverse reactions.

Contraindications

Contraindications

- Allergen immunotherapy should not be initiated in patients with poorly controlled asthma symptoms.
- Medical conditions that reduce the patient's ability to survive the systemic allergic reaction or the resultant treatment are relative contraindications for allergen immunotherapy. Examples include severe asthma uncontrolled by pharmacotherapy and significant cardiovascular disease.

Qualifying Statements

Qualifying Statements

- This is a complete and comprehensive document at the current time. The medical environment is a changing environment, and not all recommendations will be appropriate for all patients. Because this document incorporated the efforts of many participants, no single individual, including those who served on the Joint Task Force, is authorized to provide an official American Academy of Allergy, Asthma and Immunology (AAAAI) or American College of Allergy, Asthma and Immunology (ACAAI) interpretation of these practice parameters. Any request for information about or an interpretation of these practice parameters by the AAAAI or the ACAAI should be directed to the Executive Offices of the AAAAI, the ACAAI, and the Joint Council of Allergy, Asthma, and Immunology. These parameters are not designed for use by pharmaceutical companies in drug promotion.
- This document was approved by the sponsoring organizations and represents an evidence-based, broadly accepted consensus opinion. These clinical guidelines are designed to assist clinicians by providing a framework for the evaluation and treatment of patients and are not intended to replace a clinician's judgment or establish a protocol for all patients. Not all recommendations will be appropriate for all patients.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Safety

Identifying Information and Availability

Bibliographic Source(s)

Cox L, Nelson H, Lockey R, Calabria C, Chacko T, Finegold I, Nelson M, Weber R, Bernstein DI, Blessing-Moore J, Khan DA, Lang DM, Nicklas RA, Oppenheimer J, Portnoy JM, Randolph C, Schuller DE, Spector SL, Tilles S, Wallace D. Allergen immunotherapy: a practice parameter third update. J Allergy Clin Immunol. 2011 Jan;127(1 Suppl):S1-55. [479 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1996 (revised 2011 Jan)

Guideline Developer(s)

Advocacy Council of ACAAI - Medical Specialty Society

American Academy of Allergy, Asthma and Immunology - Medical Specialty Society

American College of Allergy, Asthma and Immunology - Medical Specialty Society

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Financial Disclosures/Conflicts of Interest

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S. Tilles is a speaker for Alcon; is on the advisory board for ALK, Ista, Merck, and Stallergenes; has received research support from Alcon, Amgen, Amphastar, Astellas, Boehringer Ingelheim, Ception, Genentech, Icagen, MAP Pharma, MEDA, Merck, Novartis, Roxane, and Sepracor; is Associate Editor of *AllergyWatch* and *Annals of Allergy*; and is a task force member for the Joint Task Force for Practice Parameters.

D. Wallace is a speaker and advisor for Alcon, is a speaker for Merck and Sanofi-Aventis, and is President-Elect of the ACAAI.

The rest of the authors have declared that they have no conflict of interest.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Joint Task Force on Practice Parameters, American Academy of Allergy, Asthma and Immunology, American College of Allergy, Asthma and Immunology, Joint Council of Allergy, Asthma and Immunology. Allergen immunotherapy: a practice parameter second update. J Allergy Clin Immunol 2007 Sep;120(3 Suppl):S25-85. [352 references]

Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the Joint Council of Allergy, Asthma, and Immunology (JCAAI) Web site .

Print copies: Available from JCAAI, 50 N. Brockway, Ste 3-3 Palatine, IL 60067.

Availability of Companion Documents

None available

Patient Resources

None available

NGC Status

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